

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW SPECIES OF SHORT-TAILED GERBIL
(*DIPODILLUS*) FROM MOROCCO (MAMMALIA:
CRICETIDAE: GERBILLINAE)

BY DUANE A. SCHLITTER AND HENRY W. SETZER
African Mammal Project, Division of Mammals
Smithsonian Institution, Washington, D.C. 20560

Since the description of *Dipodillus simoni* (Lataste, 1881), specimens of short-tailed gerbils have been reported rarely among collections of African rodents. Recently, however, reports of the capture of these rodents have begun to appear (Wassif, 1956:179, 1960:31; Setzer, 1958:214; Harrison, 1967:381; Ranck, 1968:149). As more specimens of gerbilline rodents have become available, interest in the generic classification of this subfamily has increased. Petter (1959) commented on generic classification of the genus *Gerbillus*. He raised the subgenus *Dipodillus*, previously including all the species of *Gerbillus* with naked plantar soles, to generic rank with *Dipodillus simoni* as the only species based on its alternating molar tubercles and shortened tail. The remaining species with bare plantar soles were retained in the subgenus *Hendecapleura* in the genus *Gerbillus*. An examination of literature plus comparison of specimens in the United States National Museum of Natural History collection shows that the genus *Dipodillus* can be distinguished from other gerbilline genera by the following combination of characters: length of tail generally averages less than length of head and body; tail lacks penicillated tip; plantar soles naked; molar tubercles alternate in position, especially M¹ (Fig. 1); tympanic bullae relatively small for the subfamily Gerbillinae; and M³ lacks cusps.

From September 1969 through July 1970, personnel of the

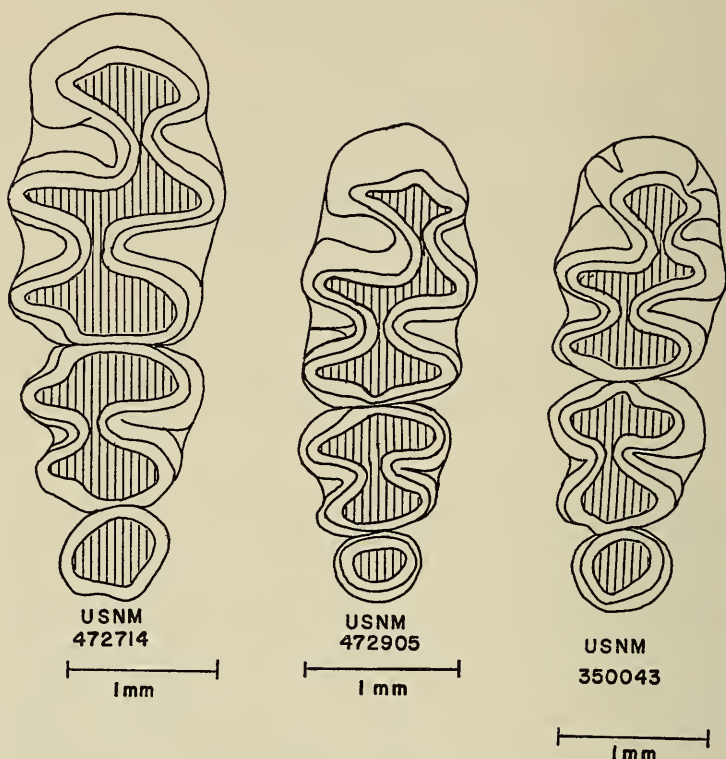


FIG. 1. Right maxillary toothrows of three species of *Dipodillus*. From left to right: 472714, holotype of *Dipodillus maghrebi* from Morocco; 472905, *Dipodillus simoni* from Morocco and 350043, *Dipodillus kaiseri* from Egypt.

Division of Mammals, Smithsonian Institution, undertook a mammal survey of Morocco in collaboration with Mohammed V University, Rabat, Morocco. Preliminary study of the resulting collection revealed a remarkable new species of *Dipodillus*.

All measurements were taken with dial calipers and are in millimeters, weights are in grams and capitalized color terms are from Ridgway "Color Standards and Color Nomenclature" 1912.

This new species may be known as:

Dipodillus maghrebi new species

Holotype: Adult male, skin and skull, United States National Museum of Natural History no. 472714, from 15 km. WSW Taounate, Fes Province, Morocco [34°29'N, 40°48'W]. Obtained 8 May 1970 by R. E. Vaden, original no. 6019.

Specimens examined: Seven, from 15 km. WSW Taounate, Fes Province, Morocco (USNM 472713-719).

Diagnosis: Upper parts near Avellaneous, purest on sides and flanks, strongly mixed with black becoming darkest on forehead; all hairs plumbeous at base. Lips, entire underparts, and dorsal surfaces of hands and feet, between Pale Ochraceous Salmon and Pale Pinkish Buff; all hairs uniformly colored to base. Purest color, at point of demarcation between dorsal and ventral color, near Light Pinkish Cinnamon. Tail obscurely bicolored, dorsal color same as color of back. Tail lacking penicillate tip but with increasing admixture of black-tipped hairs toward the distal end. Circumorbital ring of black hairs. Color of back extending to hairs on external surface of pinna; internal face of pinna grayish. Skull large for genus; zygomatic arches rugged; upper toothrow relatively long; audital portion of auditory bulla relatively small and relatively well inflated ventrally; mastoidal portion of auditory bulla not projecting beyond occiput; external auditory meatus projecting strongly anteriorly and lacking foramen of Huschke; anterior palatine foramina relatively short and wide; posterior palatine foramina short.

Measurements: External and cranial measurements of the holotype are: Total length, 224; length of tail, 110; length of hind foot, 27; length of ear from notch, 18; occipitonasal length of skull, 31.4; greatest breadth across zygomatic arches, 16.9; greatest breadth of braincase, 13.2; least interorbital breadth, 5.0; greatest length of nasals, 12.2; greatest breadth of rostrum at level of antorbital foramina, 4.7; oblique length of audital portion of auditory bulla, 8.6; greatest length of anterior palatal foramina, 5.6; greatest length of posterior palatal foramina, 1.5; greatest crown length of upper toothrow, 4.3; greatest crown breadth across M³-M³, 5.4.

Additional specimens measured: *Dipodillus simoni*: MOROCCO, Oujda Prov.: 10 km. S Ain-Benimathar (33°55'N, 2°2'W), 2. *Dipodillus kaiseri*: EGYPT, Western Desert Governorate: Burq El Arab, 2. LIBYA, Cyrenaica Prov.: 20 km. E Tobruch, 1, 3 km. E Derna, 1; Tripolitania Prov.: 12 km. S Chicla, 2, 20 km. E Rumia, 1. *Gerbillus* (H.) *hilda*: MOROCCO, Rabat Prov.: 17 km. SW Rabat (33°55'N, 6°59'W), 8. *Gerbillus* (H.) *campestris*: MOROCCO, Safi Prov.: 13 km. E Essaouira (35° 30'N, 9°40'W), 10.

Comparisons: From the two species of *Dipodillus* already known from North Africa, *D. simoni* (Lataste, 1881) and *D. kaiseri* (Setzer, 1958), this new species differs by its remarkably larger size, both externally and cranially (Tables 1 and 2).

From *Dipodillus simoni*, *Dipodillus maghrebi* differs cranially by hav-

Table 1. Selected comparative external measurements of specimens of north African *Dipodillus* and *Gerbillus* subgenus *Hendecapleura* in the United States National Museum of Natural History.¹

	N	TL	HB	Tail	HF	Ear	Weight
<i>Dipodillus maghrebi</i>	4 ♂♂	221 (210-224) ³	113.3(107-119) ³	107.7(103-110) ³	26.8(26-27)	18.5(18-19)	46 (41-58)
	3 ♀♀	216.7(208-225)	110.3(106-119)	106.3(102-111)	27 (27)	17.7(17-18)	38.7(34-44)
<i>Dipodillus simoni</i>	2 ♂♂	152, 154	81, 83	71, 71	19, 20	13, 13	18, 16
<i>Dipodillus kaiseri</i>							
Egypt	2 ♂♂	177, 172	85, 85	92, 87	22, 22	13, 12.5	-
Libya	5 ♂♂	160.4(153-169)	82.2 (81-85)	78.2 (71-84)	21 (21)	12.2(12-13)	-
<i>Gerbillus</i> (H.) <i>hilda</i>	8 ♀♀	207.9(200-216)	95.0 (89-101)	112.9(105-119)	24.6(23-25)	14.9(14-16)	22.5(20-26)
<i>Gerbillus</i> (H.) <i>campestris</i>	10 ♂♂	232.8(223-245)	101.9 (97-106)	130.9(126-139)	27.0(26-28)	16.4(13-17)	31.1(30-33)

¹Measurements are given as means followed by extremes enclosed in parentheses. Size of sample (indicated in column under N) is followed by designation of sex of specimen. Sample sizes are as given unless indicated otherwise by a number in superscript following extremes. The abbreviations used are as follows: N = number in sample; TL = total length; HB = head and body length (TL minus Tail); Tail = length of tail; HF = hind foot; Ear = length of ear from notch; Weight = weight in grams.

Table 2. Selected comparative cranial measurements of the same specimens as listed in Table 1.¹

	N	OCN	ZB	Nasal	Ob. L. Bulla	Ant. P. For.	Cr. L.	Up. Tr.	Br. M ³ -M ³
<i>Dipodillus maghrebi</i>	4 ♂ ♂	31.7(31.3-32.1)	16.9(16.4-17.8)	12.4(12.2-12.7)	8.5(8.4-8.6)	5.6(5.5-5.6)	4.3(4.2-4.3)	5.4(5.2-5.5)	
	3 ♀ ♀	30.8(30.5-31.1)	15.9(15.1-16.7)	12.0(11.7-12.4)	8.0(7.9-8.1)	5.4(5.2-5.5)	4.2(4.1-4.3)	5.3(5.2-5.4)	
<i>Dipodillus simoni</i>	2 ♂ ♂	24.4, 24.4	13.1, 13.0	9.6, 9.4	6.6, 6.5	4.8, 4.7	3.4, 3.4	4.2, 3.8	
<i>Dipodillus kaiseri</i>									
Egypt	2 ♂ ♂	25.8, 26.0	14.0, 13.8	9.5, 9.6	7.2, 7.1	4.8, 4.9	3.5, 3.4	4.0, 4.2	
Libya	5 ♂ ♂	25.6(24.6-26.5)	13.7(13.4-14.0)*	9.6 (9.1-10.3)	7.2(6.9-7.5)	4.9(4.5-5.2)	3.4(3.2-3.4)	4.1(3.9-4.4)	
<i>Gerbillus (H.) hilda</i>	8 ♀ ♀	27.6(27.2-28.2)	14.6(14.1-15.1)	10.4(10.1-10.8)	7.6(7.1-8.0)	4.6(4.2-5.0)	3.6(3.4-3.7)	4.5(4.3-4.8)	
<i>Gerbillus (H.) campestris</i>	10 ♂ ♂	29.8(28.8-30.8)	15.7(14.9-16.5)	11.5(10.7-12.5)	8.0(7.4-8.1)	5.1(4.7-5.4)	4.0(3.8-4.4)	4.7(4.3-5.2)	

¹ Abbreviations used are: OCN = occipitonasal length; ZB = zygomatic breadth; Nasal = length of nasal; Ob. L. Bulla = oblique length of audial portion of auditory bulla; Ant. P. For. = length of anterior palatine foramina; Cr. L. Up. Tr. = crown length of upper toothrow; and Br. M³-M³ = breadth across M³-M³.

ing rounded rather than truncated zygomatic plates; anterior palatine foramina "tear-drop" shaped with widest point toward posterior end; well-developed supraorbital ridges; and narrow pterygoid fossae with flaring hamuli. Between the orbits, the supraorbital ridges of *D. maghrebi* diverge more strongly posteriorly when viewed from above rather than being more nearly parallel as in *D. simoni*. Externally, *D. maghrebi* has shorter pelage with more brown color and less suffusion of black hairs than does *D. kaiseri*.

Skulls of *D. maghrebi* can be distinguished from *D. kaiseri* by the presence of more rounded rather than truncated zygomatic plates; by having the anterior palatine foramina "tear-drop" shaped with widest portion toward the posterior end; and with markedly better developed supraorbital ridges. The paler pelage of *D. simoni* serves to distinguish this species from the darker, more brownish *D. maghrebi*.

In comparison with the species of *Gerbillus* (*Gerbillus*) available to us, *Dipodillus maghrebi* can be distinguished by having the tail shorter than the head and body and lacking a terminal tuft; and by having naked rather than hairy plantar soles of the hind feet.

Of the species of the subgenus *Hendecapleura* currently known from northwest Africa, only two species, *Gerbillus campestris* and *G. hilda* approach the dimensions of *D. maghrebi*. All the other species of this subgenus from northwest Africa are smaller both externally and cranially than is *D. maghrebi*.

Gerbillus hilda, as known from specimens taken 17 km. SW Rabat, is darker in color and smaller in size than *D. maghrebi* (Table 1). In addition, as pointed out by Thomas (1918: 62) in the original description, specimens of *G. hilda* have a small band of hairs on the plantar surface of the hind foot reminiscent of the hairs found on the hind foot of *Taterillus*. Cranially, *D. maghrebi* differs from *G. hilda* by having more rugged zygomatic arches, more ventrally inflated auditory bullae and a more dorsally flattened braincase; and is generally larger in most measurements taken (Table 2).

Although nearly as long in head and body as *D. maghrebi* (Table 1), *Gerbillus campestris* has a tail which is longer than head and body and possesses a terminal pencil of black hairs. *D. maghrebi* has a longer ear and longer head and body but shorter tail than *G. campestris*. *D. maghrebi* differs cranially from *G. campestris* in the same manner as given above for *G. hilda* except for some measurements which show a small amount of overlap.

Remarks: Specimens of *Dipodillus maghrebi* were snap trapped from 8 to 12 May 1970 in old, harvested grain fields with herbaceous shrubs and grasses remaining after the harvest. The predominant soil type was clay. The only other rodent trapped in these fallow fields was *Mus musculus*.

Individuals of the genus *Dipodillus* are generally more robust of body than are those of the genus *Gerbillus*. The general robustness of this new species is evident from the weights given in Table 1. Although the four

males weighed more than the three females, the weights of the latter are still heavier than those given in the table for *Gerbillus campestris*.

A single female, weighing 44 grams, showed reproductive activity when taken on 12 May. This individual contained eight embryos (three in the right horn of the uterus) which averaged 10 millimeters in crown-rump length.

Two features of this new species warrant discussion. Firstly, *Dipodillus maghrebi* has fur shorter in length than is characteristic of specimens of *D. simoni* and *D. kaiseri*. Whether this difference is due to a seasonal change in pelage cannot be ascertained. Seasonal changes such as this are not obvious in other north African *Dipodillus* or *Gerbillus*. Secondly, whereas other species of *Dipodillus* and *Gerbillus* have pure white ventral hairs, *D. maghrebi* lacks this striking feature. It is possible that the color of the ventral fur in *D. maghrebi* is due to staining from soil or plant juices. However, various solvents normally used to test for staining proved unsuccessful.

The name *maghrebi* refers to the Arabic term for northwestern Africa.

The efforts and cooperation of Prof. Ben Ab-Jelil, Dean, Faculty of Sciences, Mohammed V University, and Prof. M. el Hilali, Chairman, Department of Animal Biology, Mohammed V University, were instrumental in enabling us to obtain this new species from Morocco. Special gratitude is extended to them for their help. Appreciation is extended to Dr. Clyde Jones for critically reading the manuscript.

The field and laboratory work upon which this paper is based were financed under PL 480 Grant SFG-0-1684 and U.S. Army Medical Research and Development Command Contract No. DA-49-193-MD-2738.

LITERATURE CITED

- HARRISON, D. L. 1967. Observations on some rodents from Tunisia, with the description of a new gerbil (Gerbillinae: Rodentia). *Mammalia* 31(3): 381-389. September.
- PETTER, F. 1959. Evolution du dessin de la surface d'usure des Molaires des gerbillidés. *Mammalia* 23(3): 304-315. September.
- RANCK, G. L. 1968. The Rodents of Libya. Taxonomy, Ecology and Zoogeographical Relationships. U.S. Nat. Mus. Bull. 275: vii + 264 pp., 9 pls., 54 figs. 2 October.
- SETZER, H. W. 1958. The Gerbils of Egypt. *J. Egyptian Pub. Health Assoc.* 33(6): 205-227.
- THOMAS, O. 1918. New Forms of *Dendromus*, *Dipodillus*, and *Gerbillus*. *Ann. Mag. Nat. Hist.* (9), vol. 2(7): 59-64. July.
- WASSIF, K. 1956. Studies on gerbils of the subgenus *Dipodillus* recorded from Egypt. *Ain Shams Sci. Bull.* 1: 173-194.
- . 1960. Further observations on *Gerbillus simoni* Lataste from the Egyptian Province (U.A.R.). *Bull. Zool. Soc. Egypt* 15: 29-31.